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# British Engineering Standards Association.

(*Incorporated 1918.*)

Formed in 1901 as The Engineering Standards Committee
by
The Institution of Civil Engineers.
The Institution of Mechanical Engineers.
The Institution of Naval Architects.
The Iron and Steel Institute.
The Institution of Electrical Engineers.

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# BRITISH STANDARD SPECIFICATION

FOR

# FIVE-AMPERE, FIFTEEN-AMPERE AND THIRTY-AMPERE TWO-PIN WALL PLUGS AND SOCKETS

FOR

## DOMESTIC PURPOSES

(WITHOUT EARTHING CONNECTION).

(REVISED DECEMBER, 1919.)

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*December, 1919.*

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THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

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NOTE.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the articles herein referred to, but does not purport to comprise all the necessary provisions of a contract.*

# BRITISH
# STANDARD SPECIFICATION
FOR
# FIVE-AMPERE, FIFTEEN-AMPERE AND THIRTY-AMPERE
# TWO-PIN WALL PLUGS AND SOCKETS
FOR
# DOMESTIC PURPOSES.
(WITHOUT EARTHING CONNECTION).
(REVISED DECEMBER, 1919.)

*The values given in British measure throughout this Specification are the Standard dimensions.*

All Two-pin Wall Plugs and Sockets for use with currents not exceeding 5, 15 and 30 amperes respectively, at pressures not exceeding 250 volts, and purporting to be British Standard, shall conform in every respect with the following requirements.

## PLUG PORTION.

### Material of Base.

**1.** The base shall be of tough incombustible insulating material which will not soften when heated to a temperature of 100°C.

### Thickness of Base.

**2.** The thickness of the base shall be not less than the values given in the table below :—

| Size of Plug. | Thickness of Base. | |
|---|---|---|
| Amperes. | inch. | mm. |
| 5 | 5/32 | 4·0 |
| 15 | 1/4 | 6·4 |
| 30 | 3/8 | 9·5 |

### Method of Entry of Flexible Wire.

**3.** The flexible wire shall enter the plug through one or more holes, grooves or glands, and shall be gripped to prevent a stress on the connections with the terminals. In all cases the flexible wire shall enter at the side.

### Size of Wiring Holes, Glands or Grooves for Flexible Wire.

**4.** The diameters of the holes or glands shall be not less than the values given in the following table :—

| Size of Plug. | No. of Holes or Glands. | Diameter of each Hole or Gland. | |
|---|---|---|---|
| Amperes. | | inch. | mm. |
| 5 | 1 | 9/32 | 7·1 |
| 15 | 1 | 11/32 | 8·7 |
| 30 | 1 | 1/2 | 12·7 |
| 5 | 2 | 3/16 | 4·8 |
| 15 | 2 | 3/16 | 4·8 |
| 30 | 2 | 9/32 | 7·1 |

When one or more grooves are provided they shall be of the same size as the holes, unless they are designed to clamp the wires as provided for in Clause 3.

### Material of Pins.

**5.** The pins shall be of phosphor bronze or hard drawn brass.

### Diameter of Pins.

**6.** The diameter of the pins before slotting shall conform to the values given below :—

| Size of Plug. | Maximum Diameter. | | Minimum Diameter. | |
|---|---|---|---|---|
| Amperes. | inch. | mm. | inch. | mm. |
| 5 | 0·201 | 5·11 | 0·199 | 5·05 |
| 15 | 0·279 | 7·09 | 0·277 | 7·04 |
| 30 | 0·313 | 7·95 | 0·311 | 7·90 |

The ends shall be rounded to facilitate entry into the socket tubes.

### Length of Pins.

**7.** The length of the portion of the pin which projects from the insulating base shall be 5/8 inch (15·9 mm.) for the 5 ampere plug, 13/16 inch (20·6 mm.) for the 15 ampere plug, and 1 1/8 inch (28·6 mm.) for the 30 ampere plug.

### Size of Slot in Pins.

**8.** The dimensions of the slot in the pins shall conform to the values given in the following table :—

| Size of Plug. | Minimum Length of Slot. | | Maximum Width of Slot. | |
|---|---|---|---|---|
| Amperes. | inch. | mm. | inch. | mm. |
| 5 | 7/16 | 11·1 | 0·023 | 0·58 |
| 15 | 5/8 | 15·9 | 0·028 | 0·71 |
| 30 | 7/8 | 22·2 | 0·028 | 0·71 |

### Spacing of Pins.

**9.** The pins shall be set on a diameter, the distance between the centres being 0·656 inch (16·66 mm.) for the 5 ampere plug, 0·875 inch (22·23 mm.) for the 15 ampere plug, and 1·25 inch (31·75 mm.) for the 30 ampere plug. The spacing shall be tested by means of the "Go" gauge shown in Figure 1, page 11.

### Material of Terminals.

**10.** The terminals shall be of brass or phosphor bronze.

### Type and Size of Terminals.

**11.** The terminals for the 5 ampere plug shall be of the Pillar type, with a hole at the side for the flexible wire. Terminals of any other type may be used for the 15 ampere and 30 ampere plugs, and if adopted they shall be of equally substantial construction, and shall provide for firmly clamping and securing the flexible wire. Pillar type terminals shall conform to the following dimensions :—

| Size of Plug. | Dimensions of Pillar Type Terminals. | | | | | |
|---|---|---|---|---|---|---|
| | If Rectangular, Minimum Length of Side. | | If Round, Minimum Diameter. | | Diameter of Hole for Flexible Wire. | |
| Amperes. | inch. | mm. | inch. | mm. | inch. | mm. |
| 5 | 0·187 × 0·187 | 4·75 × 4·75 | 0·234 | 5·94 | 0·120 | 3·05 |
| 15 | 0·280 × 0·280 | 7·11 × 7·11 | 0·311 | 7·90 | 0·156 | 3·96 |
| 30 | 0·375 × 0·375 | 9·53 × 9·53 | 0·437 | 11·10 | 0·250 | 6·35 |

The thickness of the wall where the clamping screw passes through shall be not less than 0·065 inch (1·65 mm.) for the 5 ampere plug, 0·125 inch (3·18 mm.) for the 15 ampere plug, and 0·187 inch (4·75 mm.) for the 30 ampere plug.

### Clamping Screws for Flexible Wire.

**12.** The brass screws for clamping the flexible wires shall be No. 6 B.A. screw thread for the 5 ampere plug, No. 4 B.A. screw thread for the 15 ampere plug, and No. 2 B.A. screw thread for the 30 ampere plug. When used with pillar type terminals, the screws shall have cheese heads in accordance with B. S. Report No. 57, and shall be of sufficient length under the heads to extend to the far side of the wire holes in the terminals.

The ends of the screws shall be slightly rounded to prevent cutting the wires.

### Construction of Pins and Terminals.

**13.** If a stem be used for connecting the slotted pin with the terminal it shall have a diameter not less than No. 5 B.A. screw thread for the 5 ampere plug, and not less than No. 3 B.A. screw thread over a length of not more than 0·187 inch (4·75 mm.) for the 15 ampere plug. The hole for this stem shall not break through into the wire hole of the terminal at the point opposite the clamping screw. In the 30 ampere plug each pin and terminal shall be formed in one piece.

### Enclosure of Terminals.

**14.** The terminals on the base shall be enclosed in a cover so formed as to screen all metal parts of opposite polarity from each other.

### Material of Cover.

**15.** The cover shall be either of insulating material or of metal with an insulating protection for the live parts.

### Connection between Cover and Base.

**16.** The cover shall be secured to the base in a satisfactory manner. If it be secured by screws threaded into a china top or cover, these screws shall be not smaller than No. 4 wood screws $\frac{9}{16}$ inch (14·3 mm.) long for the 5 ampere plug, No. 6 wood screws $\frac{3}{4}$ inch (19·1 mm.) long for the 15 ampere plug, and No. 8 wood screws 1 inch (25·4 mm.) long for the 30 ampere plug.

### Provision of Hand Shield.

**17.** A shield shall be provided in such a position that protection is afforded to the hand from the effects of any arcing at the contacts and at the point of entry of the flexible wire.

### Material of Hand Shield.

**18.** The hand shield shall be of hard wood or other strong, tough insulating material.

### Size of Hand Shield.

**19.** The hand shield shall have a diameter of not less than 2 inches (50·8 mm.) for the 5 ampere plug, $2\frac{1}{2}$ inches (63·5 mm.) for the 15 ampere plug, and 3 inches (76·2 mm.) for the 30 ampere plug.

### Provision of Handle.

**20.** A handle or knob shall be provided, the diameter of which shall not exceed $\frac{3}{4}$ inch (19·1 mm.) for the 5 ampere plug, $1\frac{1}{4}$ inches (31·8 mm.) for the 15 ampere plug, and $1\frac{1}{2}$ inches (38·1 mm.) for the 30 ampere plug.

## SOCKET PORTION.

### Material of Base.

**21.** The base shall be of vitreous material or a tough incombustible insulating material which will not soften when heated to a temperature of 100° C. ; and in either case, after twenty-four hours' immersion in water, the material shall not increase in weight more than one-half per cent. after all moisture has been removed from the surface.

### Recess in Base.

**22.** When the base is intended to be fixed to a flat surface a recess shall be provided at the back not exceeding $\frac{1}{16}$ inch (1·6 mm.) in depth to ensure proper seating.

### Holes for Fixing Screws for Surface Type Sockets.

**23.** At least two holes for the fixing screws for surface type sockets shall be provided.

### Size of Fixing Ring for Flush Type Sockets.

**24.** When the insulating base is carried by a metal ring or plate forming a flush type of socket the diameter and thickness of the ring or plate shall conform to the values given below :—

| Size of Plug. | Diameter of Ring or Plate. | | Minimum Thickness of Ring or Plate. | |
|---|---|---|---|---|
| Amperes. | inches. | mm. | inch. | mm. |
| 5 | 2·5 | 63·5 | 0·062 | 1·57 |
| 15 | 2·75 | 69·8 | 0·062 | 1·57 |
| 30 | 3·5 | 88·9 | 0·080 | 2·03 |

### Material of Fixing Ring for Flush Type Sockets.

**25.** The fixing ring for flush type sockets shall be of brass.

### Centres of Holes for Fixing Screws for Flush Type Sockets.

**26.** In the 5 ampere and 15 ampere flush type sockets two holes for the fixing screws shall be provided, set on a diameter at right angles to a line through the contact tubes, 2 inches (50·80 mm.) apart centre to centre, and 2·25 inches (57·15 mm.) apart centre to centre respectively. In the 30 ampere socket three holes shall be provided, equidistant from one another, set on a circle of 1·5 inches (38·10 mm.) radius.

### Size and Shape of Holes for Fixing Screws.

**27.** The fixing-down holes shall be suitable for No. 6 wood screws with countersunk heads in the 5 ampere and 15 ampere sockets, and for No. 8 wood screws with countersunk heads in the 30 ampere sockets.

### Size and Shape of Holes in Base for Hard Wires.

**28.** The diameters of the holes for the hard wires in the insulating bases, and the depth of the terminal fittings below the seating surface shall conform to the values given in the following table :—

| Size of Socket | Minimum Diameter at Front. | | Minimum Diameter at Back. | | Minimum Depth. | |
|---|---|---|---|---|---|---|
| Amperes. | inch. | mm. | inch. | mm. | inch. | mm. |
| 5 | 3/16 | 4·8 | 5/16 | 7·9 | 1/8 | 3·2 |
| 15 | 1/4 | 6·4 | 3/8 | 9·5 | 1/4 | 6·4 |
| 30 | 5/16 | 7·9 | 1/2 | 12·7 | 3/8 | 9·5 |

### Separation of Metal Parts of Opposite Polarity.

**29.** The base shall be so formed that the insulating material screens all metal parts of opposite polarity from each other.

### Material of Contact Tubes.

**30.** The contact tubes shall be of brass.

### Internal Diameter of Contact Tubes.

**31.** The contact tubes shall be rounded at the points of entry to provide easy access for the pins, and shall have the internal diameters given below:—

| Size of Socket. | Maximum Internal Diameter. | | Minimum Internal Diameter. | |
|---|---|---|---|---|
| Amperes. | inch. | mm. | inch. | mm. |
| 5 | 0·204 | 5·18 | 0·202 | 5·13 |
| 15 | 0·282 | 7·16 | 0·280 | 7·11 |
| 30 | 0·316 | 8·03 | 0·314 | 7·98 |

### Length of Contact between Plug and Socket.

**32.** The contact tubes shall engage with the pins for a length of not less than $\frac{5}{16}$ inch (7·9 mm.) for the 5 ampere socket, $\frac{3}{8}$ inch (9·5 mm.) for the 15 ampere socket, and $\frac{5}{8}$ inch (15·9 mm.) for the 30 ampere socket, exclusive of the rounded ends of pins and contact tubes.

### Spacing of Contact Tubes.

**33.** The contact tubes shall be set on a diameter and so mounted as to take a "Go" gauge with pins 0·201 inch (5·11 mm.) in diameter, set at a distance of 0·656 inch (16·66 mm.) apart centre to centre for the 5 ampere socket, with pins 0·279 inch (7·09 mm.) in diameter, 0·875 inch (22·23 mm.) apart centre to centre for the 15 ampere socket, and with pins 0·313 inch (7·95 mm.) in diameter, 1·25 inches (31·75 mm.) apart centre to centre for the 30 ampere socket. The spacing shall be tested by means of the "Go" gauge shown in Figure 2 (page 11).

### Recess for Contact Tubes.

**34.** The contact tubes shall be recessed in the insulating base, or a cover shall be fixed so that it is impossible to touch the contact tubes unintentionally. The holes for the pins through the insulating material for the 15 ampere socket shall at some part not exceed 0·350 inch (8·9 mm.) in diameter, and for the 30 ampere socket shall at some part not exceed 0·375 inch (9·5 mm.) in diameter.

### Material of Terminals.

**35.** The terminals shall be of brass.

### Type and Size of Terminals.

**36** The terminals shall be of the Pillar or Through type in which the hard wires are secured under the ends of the side clamping screws; and the diameter of the hole in each terminal and the thickness of the wall where the clamping screw passes through shall conform to the values given below:—

| Size of Socket. | Minimum Diameter of Hole. | | Minimum Thickness of Wall. | |
|---|---|---|---|---|
| Amperes. | inch. | mm. | inch. | mm. |
| 5 | 0·140 | 3·56 | 0·065 | 1·65 |
| 15 | 0·172 | 4·37 | 0·125 | 3·18 |
| 30 | 0·250 | 6·35 | 0·187 | 4·75 |

### Material of Connecting Plate.

**37.** When a plate is used to connect the contact tube to the terminal it shall be of brass.

### Method of Connecting Contact Tubes to Terminals.

**38.** When a connecting plate is used it shall be not less than 0·078 inch (1·98 mm.) thick for the 5 ampere socket and 0·125 inch (3·18 mm.) thick for the 15 ampere socket; and the contact tube and terminal shall be riveted or screwed into the connecting plate or held to it in any other manner not less secure. If the contact tube and terminal are screwed into it all the threads of the plate shall be engaged. In the 30 ampere socket the contact tubes shall not be connected to the terminals by means of plates, but shall be either formed in one piece with the terminals or directly and firmly screwed into them to a depth of not less than 0·375 inch (9·53 mm.).

### Clamping Screws in Terminals.

**39.** The brass side screws for clamping the wires in the terminals shall be No. 5 B.A. screw thread for the 5 ampere socket, No. 4 B.A. screw thread for the 15 ampere socket, and No. 2 B.A. screw thread for the 30 ampere socket, with cheese heads in accordance with B.S. Report No. 57, and shall be of sufficient length under the heads to extend to the far side of the wire holes in the terminals. The ends of the screws shall be slightly rounded to prevent cutting the wires.

### Material and Type of Cover.

**40.** The terminal parts of the base shall be protected by a cover or case of insulating material or metal. If of metal the cover shall be well clear of the live parts or lined with insulating material.

## GENERAL.

### Marking the Current Carrying Capacity.

**41.** All sockets shall be indelibly and distinctly marked to indicate that they are intended to carry 5 amperes, 15 amperes or 30 amperes respectively.

### Gauges.

**42.** Shop Gauges employed for the purposes of this Specification shall from time to time be checked against reference gauges (*see* Appendix). These reference gauges shall have been verified and their accuracy certified by the National Physical Laboratory.

### Independent Tests.

**43.** In the event of any difference between the representative of the Purchaser and the Manufacturer as to whether the article supplied is in conformity with all the requirements of this Specification, either party shall have the right to have tests carried out by an independent authority to be mutually agreed upon by the parties, or, failing such agreement, by the National Physical Laboratory. The expenses attendant upon such independent testing shall be borne by the party adjudged to be in the wrong.

## GAUGES FOR PLUGS AND SOCKETS.

(The Figures are not intended to show the details of construction.)

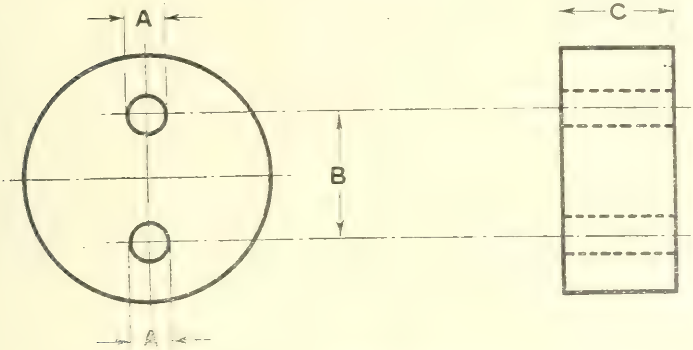

FIG. 1.—"GO" GAUGE FOR PLUG.

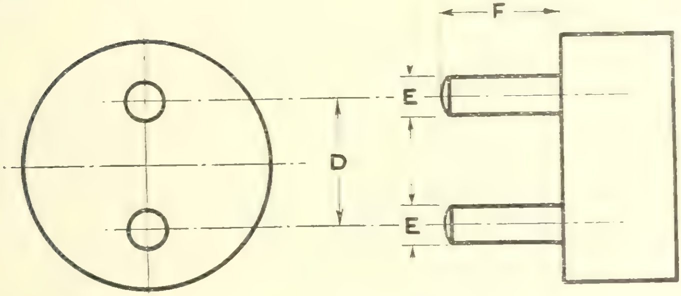

FIG. 2.—"GO" GAUGE FOR SOCKET.

### TABLE OF DIMENSIONS.

| Gauge Nos. | Size. Amperes. | A | | B | | C | D | | E | | F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tolerance. | | Tolerance. | | | Tolerance. | | Tolerance. | |
| | | in. | in. | in. | in. | in. | in. | in. | in. | in. | in. |
| 1 and 2 | 5 | 0·202 | +0·0003<br>−0·0000 | 0·656 | ±0·0005 | 5/8 | 0·656 | ±0·0005 | 0·201 | +0·0000<br>−0·0002 | 5/8 |
| 3 ,, 4 | 15 | 0·280 | +0·0003<br>−0·0000 | 0·875 | ±0·0005 | 13/16 | 0·875 | ±0·0005 | 0·279 | +0·0000<br>−0·0002 | 13/16 |
| 5 ,, 6 | 30 | 0·314 | +0·0003<br>−0·0000 | 1·250 | ±0·0005 | 1 1/8 | 1·250 | ±0·0005 | 0·313 | +0·0000<br>−0·0002 | 1 1/8 |

# APPENDIX.

## STANDARD GAUGES.

A Standard Gauge is a male or female gauge, having plain cylindrical surfaces, suitable for depositing with the National Physical Laboratory for purposes of reference.

## REFERENCE GAUGES.

A Reference Gauge is a male or female gauge, having plain cylindrical surfaces, and is intended for use by manufacturers and others for checking their own shop gauges. The reference gauges shall be verified and their accuracy certified by the National Physical Laboratory.

## SHOP GAUGES.

A Shop Gauge is a gauge actually used in the shop for testing the dimensions of the article referred to in this Specification and checked from time to time against the reference gauges.

# British Engineering Standards Association.

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